Submitted to:
US EPA Region 8
Denver, CO

Submitted by:
Atlantic Richfield Company
Anchorage, AK
July 25, 2011

# Construction Quality Assurance Project Plan (CQAPP)

## St. Louis Pond Area Construction
## Rico-Argentine Mine Site – Rico Tunnels
## Operable Unit OU01
## Rico, Colorado

# Atlantic Richfield Company

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July 25, 2011

Mr. Steven Way
On-Scene Coordinator
Emergency Response Program (8EPR-SA)
US EPA Region 8
1595 Wynkoop Street
Denver, CO 80202-1129

Subject: Construction Quality Assurance Project Plan (CQAPP)
Rico-Argentine Mine Site – Rico Tunnels
Operable Unit OU01 Rico, Colorado

Dear Mr. Way,

Please find enclosed three (3) copies of the *Construction Quality Assurance Project Plan* dated July 25, 2011; in addition, an electronic copy of this document in PDF file format is being submitted via email.

If you have any questions, please feel free to contact me at 406.491.1129.

Sincerely,

Chuck Stilwell, P.E.
Project Manager
Atlantic Richfield Company

Enclosures

cc: R. Halsey, AR
S. Dischler, AR
T. Moore, AR
C. Sanchez, Anderson Engineering
T. Kreutz, AECOM (w/o encl.)
D.Yadon, AECOM (w/o encl.)
J. Decker, AECOM (w/o encl.)

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# List of Acronyms

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|---|---|
| AECI | Anderson Engineering Co. Inc. |
| AECOM | AECOM Consultants |
| AR | Atlantic Richfield Co. |
| BMP | Best Management Practices |
| CQA | Construction Quality Assurance |
| CQA/CQC | Construction Quality Assurance/Construction Quality Control |
| CQAPP | Construction Quality Assurance Project Plan |
| CQC | Construction Quality Control |
| CDPHE | Colorado Department of Public Health and Environment |
| CSP | Certified Safety Professional |
| EPA | Environmental Protection Agency |
| HASP | Health and Safety Plan |
| HSO | Health and Safety Officer |
| ISRP | Initial Solids Removal Plan |
| O&M | Operation and Maintenance |
| OSC | EPA On-Scene Coordinator |
| PE | Professional Engineer |
| POTW | Publicly Owned Treatment Works |
| QC | Quality Control |
| Site | St Louis Ponds and Adjacent Area |

# 1 Introduction

Anderson Engineering Co. Inc. (AECI), in cooperation with AECOM and on behalf of Atlantic Richfield Co (AR), has prepared this Construction Quality Assurance Project Plan (CQAPP) for construction activities in the vicinity of the St. Louis Pond system. The work shall include the removal of pond solids, construction of drying areas, drying of the removed solids, construction of a solids repository, pond repairs and improvements and St. Louis Adit discharge water treatment/management facility construction. The work is to be perfonned in the area of the St Louis Ponds, north of Rico Colorado within Dolores County. This plan addresses Construction Quality Assurance (CQA) and Construction Quality Control (CQC) for construction activities as part of managing the total project quality to meet the project expectations.

The objectives of CQA are to:

- Ensure through observation, inspection, and measurements that the work and materials incorporated into the project are in conformity with the pertinent requirements of the project Construction Plans and Specifications.
- Provide an opportunity for timely response when resuhs indicate that either the materials or the work are not in conformity with the requirements of the project Construction Plans and Specifications.
- Provide an opportunity for timely response when observations indicate that unanticipated conditions, the material, or work as constructed are not consistent with the overall intent of the selected remedy.

A summary of the CQA inspection requirements and frequencies will be provided with specific activity work plans.

CQC is a component of CQA involving specific test procedures, frequencies, and standards to ensure that materials and work meet the requirements of the project Construction Plans and Specifications. The objectives of CQC are to:

- Ensure through inspection and both laboratory and field testing that the work and materials incorporated into the project are in conformity with the pertinent requirements of the project Construction Plans and Specifications.
- Provide an opportunity for timely response when test results indicate that either the materials or the work are not in conformity with the requirements of the project Construction Plans and Specifications.

- Document all calibrations of test equipment, quality control testing, inspections, and observations. Identify any corrective actions required, document completed corrective actions, and record any discrepancies.

## 1.1 Purpose

The purpose of this CQAPP is to present the quality assurance program to be implemented during initial solids removal and drying. This CQAPP is specifically applicable to the upper pond solids removal by mechanical excavation or as required (due to wet conditions) removal of saturated solids by suction dredge operation, construction of four drying cells and drying of the removed solids, construction of a solids repository, pond repairs and improvements and St. Louis Adit discharge water treatment facility construction activities. Controls measures for the collapsed St Louis tunnel adit will also be accomplished. This CQAPP was prepared to ensure that, with a reasonable degree of certainty, the removal, drying and construction activities meet or exceed all design criteria, and Construction Plans and Specifications.

## 1.2 Organization

This report is organized as follows:

- Section 1 presents the purpose and organization of the report
- Section 2 outlines the project organization, roles and responsibilities
- Section 3 presents the project meeting requirements
- Section 4 describes the inspection and testing activities required to ensure that construction and materials comply with all Construction Plans and Specifications
- Section 5 describes documentation requirements of construction quality asstirance activities
- Section 6 describes surveying and site layout, and
- Section 7 describes site security.

# 2 Project Organization, Roles, and Responsibilities

The purpose of this section is to define the areas of responsibility and lines of authority for each organization and for the members of the CQA/CQC team. This will be used to establish lines of communication to facilitate the decision-making process during implementation of the CQAPP. The project management organization for construction is presented on Figure 1.

Responsibilities of team members are described in the following sections.

## 2.1 Regulatory/Permitting Agency

As the regulatory agency, the U.S. Environmental Protection Agency (EPA) is responsible for overseeing AR performance of work for consistency and compliance with the provisions of the Removal Action Work Plan. EPA will designate an individual as its On-Scene Coordinator (OSC). The EPA or their oversight contractor will periodically be on site during pond area construction activities.

## 2.2 Facility Owner

As the responsible party, AR has the ultimate responsibility and authority for the project. AR will coordinate the overall management of implementation of the pond area construction activities.

AR is responsible for complying with the Project Documents and has the authority to select and dismiss organizations charged with design, construction activities, and CQA responsibilities. AR also has the authority to accept or reject Construction Plans and Specifications, CQAPP, reports, and recommendations of the CQA Officer and the materials and workmanship of any Contractor.

### 2.2.1 Project Manager

Mr. Chuck Stilwell, P.E. has been selected by AR to fulfill the responsibilities of the Project Manager. Mr. Stilwell possesses the necessary skills and expertise to carry out their responsibilities.

As the Project Manager, Mr. Stilwell will be AR's key contact person for EPA during the remedial action. The Project Manager will also:

- Approve and sign submittals and progress reports. The Project Manager may authorize others to sign submittals and progress reports on his behalf

- Certify that the construction has been completed in full satisfaction of the design and specification requirements. The Project Manager will sign the Completion of Construction Report in addition to a certifying professional engineer.
- Assist EPA as required for Community Relations.

## 2.3 Construction Manager

Mr. Christopher Sanchez, C.S.P. (AECI) will serve as the Constmction Manager for the pond area construction activities. The duties of the Construction Manager include:

- Report to the Project Manager for AR
- Oversee on-site project activities
- Coordinate and schedule activities for the Contractors performing the work
- Ensure that site activities are recorded
- Oversee project schedule
- Chair project meetings

## 2.4 Design/Certifying Engineer

Mr. Thomas Kreutz, P.E. or Mr. Doug Yadon, P.E. (AECOM) will serve as the Design/Certifying Engineer. The Design/Certifying Engineer is responsible for the preparation of the Construction Plans and Specifications. In addition, the Design/Certifying Engineer will be responsible for:

- Design modifications deemed necessary during the course of construction.
- Periodic observation, when on site, of construction to assure that the work is harmonious with the Engineer's intentions.
- Interpretation of the Construction Plans and Specifications.
- Certify that the project was completed in accordance with the Construction Plans and Specifications and this CQAPP.
- Participate in key technical discussions with EPA
- Oversee and sign technical submittals
- Oversee CQAPP implementation.

## 2.5 Construction Quality Assurance (CQA) Officer

Mr. Christopher Sudol (AECI) will serve as the CQA Officer. The CQA Officer will be on site during construction to supervise and be responsible for all inspections and testing in accordance with the approved CQAPP and Construction Plans and Specifications. The duties of the CQA Officer are as follows:

- Monitor completion of record drawings.
- Monitor construction contractor compliance with submittal requirements.
- Provide field management of CQA activities.
- Review Project Documents for clarity and completeness so that the CQAPP can be implemented.
- Inform CQA support personnel on CQA requirements and procedures.
- The CQA officer shall exercise professional judgement to certify that pipe sizes, material, placement and pipe grades are in accordance with the design.
- The CQA officer shall inspect all prefabricated structures for conformity with design specifications and for defective manufacturing.
- Ensure that regular calibration of testing equipment is conducted and recorded.
- Ensure that CQA test results are accurately recorded.
- Identify work that should be accepted, rejected, or uncovered for observation, or that may require special testing, inspection, or approval.
- Reject defective work and verify that corrective measures are implemented.
- Scheduling and coordinating CQA inspection activities.

## 2.6 Health and Safety Officer

Mr. Christopher Sanchez, C.S.P. (AECI) or appointed designee will serve as the Health and Safety Officer (HSO). The HSO will ensure that all Health and Safety Plan (HASP) requirements are effectively employed and enforced during activities completed on-site.

## 2.7 Contractor(s)

The General Contractor for the ISRP will be Flare Construction. Mr. Chad Simister will be the Contractor's Project Manager. hiformation regarding other task specific general contractors will be provided to EPA as the contractors are selected. The General Contractor(s) and its subcontractors will be responsible for supplying materials and labor to construct the project in reasonable conformity with the requirements of the latest Project Documents. As such, each Contractor is responsible for CQC to ensure that the work meets the requirements of the Project Documents.

Before performing work at the site, the Contractor must ensure that all necessary EPA approvals, authorizations, and coordination for EPA oversight have been secured or arranged. Work performed at the site without the necessary EPA approvals or authorizations will not be considered to be part of the remedy unless acknowledged and approved by EPA. However, EPA will be under no obligation to acknowledge any work undertaken without the necessary EPA approvals, authorizations, or construction observation.

CQC services furnished by the Contractor will include all laboratory and field testing, inspection, documentation of inspection, identification of any corrective actions required, documentation of completed corrective actions, written disposition on any discrepancies, and responses to the concerns of the CQA Officer. In addition, when requested by the CQA Officer, OSC, or the EPA oversight contractor, the Contractor will furnish access, facilities, and labor assistance, as necessary, for the duties to be performed by the CQA Officer, OSC, or EPA oversight contractor.

The Contractor will inform the CQA Officer and the EPA oversight contractor of CQC sampling and testing and, if requested, and coordinate such sampling with any or all of these individuals.

Within seven calendar days of discovering that, based on the results of CQC testing or inspection, one or more project requirements are not being met, the Contractor will provide a copy of the test results or inspection report and a plan to correct or otherwise address the deficiency to the CQA Officer, and EPA. Upon approval, the Contractor will execute the plan and document its completion and outcome.

The Contractor will immediately notify the CQA Officer of any unanticipated conditions encountered during remediation or any other condition that the Contractor knows or suspects could affect the ability of the design to meet remediation objectives.

### 2.7.1 Construction Quality Control (CQC) Officer

Each Contractor will designate a CQC Officer. The CQC Officer is responsible for:

- Scheduling and coordinating CQC inspection activities
- Perform observations and tests by verifying that:
  - Regular calibration of testing equipment is properly conducted and recorded
  - The testing equipment, personnel and procedures do not change over time or that any changes do not adversely impact the inspection process
  - The test data are accurately recorded and maintained
- Preparing and tracking submittals required by the Project Documents
- Reviewing task plans and operating procedures to ensure quality objectives are met
- Ensuring that CQC testing is performed, as required by the Project Documents, or as necessary to provide a quality product
- Ensuring that materials and equipment meet specifications before purchased and incorporated into the work
- Reviewing land survey services to ensure surveys are completed in an accurate and timely manner, and specification drawings are updated as work progresses in preparation for the as-built drawings
- Ensuring that all data required for the as-built drawings are collected before any work is closed/concealed
- Identifying deficient work items and recommending corrective actions
- Ensuring that agreed-upon corrective actions have been conducted and are sufficient to correct the deficiency

- Providing the CQA Officer with reports on the inspection results including:
  - Review and interpretation of all data sheets and reports
  - Identification of work that should be accepted, rejected or uncovered for observation, or that may require special testing, inspection or approval
  - Rejection of defective work and verification that corrective measures are implemented
  - Verification that a Contractor's CQC is in accordance with the Project Documents

CQC support personnel include persons experienced in their respective field of expertise and who will perfonn CQC for their specific aspect of the work. CQC Support Personnel will include, at a minimum:

- Surveyor to verify elevations
- Geotechnical laboratory personnel to certify soil conditions, and
- Personnel to certify pipe installation.

The duties of the CQC Support Personnel are as follows:

- Conduct CQC tests and inspections as indicated in the CQAPP
- Accurately record test results and inspections
- Calibrate testing equipment in good working order, and
- Immediately notify CQC Officer whether or not test results comply with specifications.

### 2.7.2 Quality Assurance/Quality Control (CQA/CQC) Testing Laboratories

CQA/CQC Testing Laboratories that will conduct CQA/CQC tests will be selected and identified by the Contractors. AECI must approve the selected CQC laboratory prior to employing the laboratory and prior to commencement of construction activities. The duties of the CQA/CQC Testing Laboratories are to provide CQA/CQC testing of construction activities, as requested by the CQC Officer and CQA Officer, to confirm construction activities have been implemented according to the Project Documents.

# 3 Project Meetings

Project meetings as detailed herein will be held during the construction period to ensure that all tasks are accomplished according to schedule and that they are completed in accordance with the Project Documents. Project meetings will be held at the site in Rico, Colorado. The following sections describe the purpose and topics of the expected meetings and the personnel that needs to attend each.

For all meetings held on site during the construction, the CQA Officer will take minutes. Copies of the minutes will be forwarded to EPA and all organizations present at the meetings.

## 3.1 Pre-Construction Meeting

### Purpose

To resolve any uncertainties in the Project Documents, and to review levels of responsibility, reporting requirements, and health and safety requirements.

### Present

AR Project Manager, Construction Manager, Design/Certifying Engineer, Contractor Representative, CQA Officer, and EPA and/or oversight contractor.

### Topics

- Present requirements of CQAPP, Site-specific HASP, and other relevant documents.
- Review the activities to be conducted during construction.
- Review roles of each organization relative to the Project Documents.
- Determine any need to modify the CQAPP that may be necessary to ensure that the construction is performed to meet or exceed the specified design criteria.
- Review lines of authority and communication.
- Discuss the established procedures or protocol for observations and tests including sampling strategies.
- Discuss the established procedures or protocols for handling construction deficiencies, repairs, and re-testing.

- Review methods for documenting and reporting inspection data.
- Review methods for distributing and storing documents and reports.
- Review work area delineation, security, and safety protocol.
- Discuss the location for storing construction equipment and materials and the protection of these items during inclement weather.
- Discuss the protection of uncompleted construction work during off-hours and during inclement weather.
- Conduct a site tour to verify design criteria, plans, and specifications are understood, and to review equipment and material storage locations.

## 3.2 Weekly Progress Meetings

### Purpose

To provide an update of work progress on a weekly basis, and identify schedule slippages and efforts required to get back onto schedule, if required. These meetings will also provide construction progress update to EPA.

### Present

AR Project Manager (as required), Construction Manager, CQA Officer, Design/Certifying Engineer (as required), Contractor Representatives (as required), HSO, and EPA and/or oversight contractor (as required).

### Topics

- Review health and safety deficiencies for previous period's activities and review health and safety requirements and potential problems for the upcoming activities.
- Review work activities for the previous period.
- Compare actual progress to scheduled work activities, noting of schedule slippages, and discuss actions to be implemented to regain project schedules.
- Review work activities for the next period.
- Review potential construction problems and proposed solutions.
- Review potential change orders to the Contract.

## 3.3 Problem Resolution Meetings

### Purpose

Meetings held as required if a problem or deficiency is present or likely to occur.

### Present

AR Project Manager (as required), Construction Manager, CQA Officer, CQC Officer (as required), Design/Certifying Engineer (as required), Contractor Representatives, and EPA and/or oversight contractor (as required).

### Topics

- Define and discuss problem or deficiency.
- Review altemative solutions.
- Develop and implement a plan to resolve the problem or deficiency.

## 3.4 Pre-Installation Meetings

### Purpose

To review conditions of installation, preparation, and installation procedures of major components of the pond construction work.

### Present

Construction Manager, CQA Officer, Contractor Representatives, Design/Certifying Engineer (as required), and EPA and/or oversight contractor (as required).

### Topics

- Review coordination of related work.
- Review preparation and installation procedures.

## 3.5 Pre-Final Completion of Construction Inspection

### Purpose

To determine whether the project is complete and consistent with the EPA approved final documents and approved work.

### Present

AR Project Manager, Construction Manager, CQA Officer, Design/Certifying Engineer, and EPA and/or oversight contractor.

### Topics

- Walk-through inspection of the entire project site.
- Identify and note any outstanding construction work.
- Review of test for treatment equipment and certify.

## 3.6 Final Completion of Construction Inspection

### Purpose

To verify that outstanding issues identified during the Pre-final Completion of Construction Inspection were addressed.

### Present

AR Project Manager, Construction Manager, CQA Officer, Design/Certifying Engineer, and EPA and/or oversight contractor.

### Topics

- Walk-through inspection of the entire project site.
- Verify that all outstanding construction work identified during the Pre-final Completion of Construction Inspection was addressed.

# 4 Inspection and Testing Activities

## 4.1 Scope

Throughout implementation of the construction activities there will be inspections and testing requirements for specific work tasks. The inspection and testing requirements will ensure compliance with the Project Documents, as well as ensure completion of the work tasks to the highest level of quality. Inspections and testing will provide a means of monitoring the quality and progress of work performed.

## 4.2 Inspections

Throughout the period of construction, the quality of work completed and material used for each of the work tasks will be maintained at its highest possible level through regular inspections of the work. The CQA Officer, CQC personnel, and representatives of EPA (as required) will complete inspections throughout construction.

In general, inspections to be conducted by the CQA Officer and CQC personnel include the following:

- Daily inspections of the work progress
- Inspections of material as it is delivered to the site to check for physical damage or other characteristics rendering material unsuitable for use
- Comparison of the material delivered to the site to the design specifications to ensure that the material delivered to the site meets applicable project specifications
- Inspection of materials following installation to verify that materials have not been damaged during installation and that the materials have been installed in accordance with the Project Documents
- A pre-construction inspection will be performed prior to beginning work on any major work task. The pre-construction inspection will include the following:
  - Review of contract requirements to ensure that all materials and/or equipment have been determined to meet applicable standards and specifications,
  - Confirmation that provisions have been made to provide required Quality Control (QC) testing,

- Examination of the work area to ascertain that all applicable preliminary work tasks have been completed, and
- Coordination of work activities with corresponding CQA required testing and inspections.

- General inspections will be performed periodically as the amount of work completed warrants an inspection. A general inspection will include the following:
  - Examination of the quality of workmanship,
  - Testing of materials for compliance with contract requirements,
  - Any identification of omissions, and
  - General progress of work performed.
- A final inspection will be performed upon completion of each work task to ensure compliance with the Project Documents and to ensure that deficiencies identified in the general inspections have been corrected

The CQA Officer will perform these inspections and the results of the inspections will be provided in the final construction report. The CQA Officer will notify EPA representatives at least three days in advance of any major final inspections. The results of all inspections will be recorded in the daily site logbook as described in Section 5.2.

The components of each work task to be inspected, the types of inspections required and the frequency of the inspections are detailed in the Construction Specifications.

## 4.3 Testing

In addition to the daily construction progress inspections, quality control testing of materials and equipment testing will be carried out as required in the CQAPP and the Project Documents. In some cases, the required testing can be performed at the manufacturing facility, while in other instances the testing is required once the component is on-site or installed. Testing of select material and equipment provides additional assurances that the component has been properly manufactured, installed, and coordinated with other components of construction.

The testing requirements, methods/standards for testing, testing frequency for each of these work-task components, and submittals (test reports, certificates verifying material quality/workmanship, etc.) are detailed in the Construction Specifications.

# 5 CQA/CQC Documentation

Proper documentation and reporting will be an integral part of the CQA/CQC activities. This section specifically deals with the record keeping and storage of CQA/CQC documents and final acceptance of the project.

## 5.1 General

This section details the documentation requirements for the CQAPP. The proper, thorough, and accurate documentation of all CQA site activities is important in ensuring quality installation. CQA testing will be documented daily.

## 5.2 Supervising Contractor's Daily Site Log Book

A representative of the Supervising Contractor will record daily QC activities in a Daily Site Log Book to be kept on-site at all times. The logbook will include the following information:

- Date, time, and weather conditions
- Present phase and location of construction activities
- Health and safety considerations
- All site activities including equipment and personnel on the project
- A summary of any meetings held and attendees
- Decisions made regarding records and approval of units of material or project activity
- Supplier submittals including documentation identifying material characteristics and quantities of material delivered to the site
- Quantitative identification of work progress
- The calibration and recalibration of test equipment
- QC test and inspection results
- The daily inspection report from each inspector
- Construction delays, and causes
- Areas affected by delays
- Construction problems and corrective actions

- Material and/or equipment delivered to the site and demobilized from the site
- Corrective actions to be taken in cases of substandard quality
- Instructions given by the CQA Officer
- Changed conditions/conflicts encountered, and
- Remarks.

The Construction Manager for the Supervising Contractor will sign the log entry daily as verification to its correctness. A copy of the signed entry will be provided to the CQA Officer on a daily basis for verification.

## 5.3 CQC Instrument Calibration

The CQC personnel will record calibrations of test equipment in an Instrument Calibration Logbook, maintained on-site by the CQA Officer. Actions taken as a result of re-calibration will be recorded in the Inspection Logbook, as described in the next section.

## 5.4 Inspection Log Book

The CQC personnel will record all observations and QC field tests in an Inspection Logbook. These books will be kept on-site and maintained by the CQC Officer. The Inspection Logbook will include the following information:

- Date, time, weather conditions
- Description or titie of the inspection activity
- Location of the inspection activity or location at which the testing or sample collection was completed
- Type of inspection activity and procedure used (reference to standard method when appropriate)
- Recorded observation or test data, with all necessary calculations
- Results of the inspection activity and comparison with specification requirements
- Personnel involved in the inspection activity, and
- Signature of the appropriate CQC inspection personnel and concurrence by the CQA Officer.

Items above shall be formulated into checklists so that details are not overlooked.

## 5.5 Problem/Corrective Action Reports

A problem is defined as material or workmanship that does not meet the construction specifications. Problem/Corrective Action Reports should be cross-referenced to specific inspection entries in the Inspection Logbook where the problem was identified.

Problem/Corrective Action Reports will include the following information:

- Detailed description of the problem
- Location of the problem
- Probable cause
- How and when the problem was located (reference to Inspection Log Book)
- Estimation of how long problem has existed
- Suggested corrective action
- Documentation of correction (reference to Inspection Log Book)
- Final results
- Suggested methods to prevent similar problems, and
- Signature of the appropriate CQC personnel and concurrence by the CQA Officer.

In some cases, not all of the above information will be available or obtainable. However, when available, such efforts to document problems could help to avoid similar problems in the future.

## 5.6 Project Modifications

During the course of construction, modifications may be identified to enhance system performance, improve constructability, or provide better value. The procedures to be employed in the review and approval of any identified modification depend on the significance and magnitude of the change with respect to the overall project. Three types of modifications are defined as follows:

- Process-Related Modifications are proposed design or construction changes that could affect the performance of the remedy

- Other Design Modifications are proposed changes to building structures or other components which do not have the potential of affecting the performance of the remedy but nonetheless require detailed engineering evaluation and approval, and

- Minor Modifications are proposed changes for constructability that do not have the potential of affecting the remedy and require minimal engineering review.

Process-Related Modifications to the design will be prepared, as directed by AR, and presented to EPA for review and approval. No Process-Related Modifications will be forwarded to the Contractor's for inclusion in the work without prior approval.

Other Design Modifications may be made from time to time throughout the project to improve constructability or increase value. AECI, AECOM or the Contractor will initiate these modifications as value engineering changes. All design modifications will be evaluated by AR, AECI, AECOM and will require EPA approval.

In addition, the Contractor may institute Minor Modifications. In this case, AECI will work closely with the Contractor to continuously record any changes or modifications to the design drawings or specifications. Minor Modifications will be initiated without prior notification of the EPA. Minor Modifications will be verbally identified to the EPA oversight contractor in a timely manner as part of general project communication with EPA.

Records of all project modifications will be kept on-site. Copies of these records will be provided to the EPA.

## 5.7 Project Documents and Records

### 5.7.1 Shop Drawings

For some elements of construction, the construction specifications require the Contractor to prepare technical data and submit this information to AECI/AECOM for review. This prevents any misinterpretation of the construction specifications that may otherwise impact the design objectives or construction schedule. Typical submittals required as part of the technical specifications include, but are not limited to: material samples; manufacturers' product literature; dimensioned engineering drawings of the component; installation drawings; operating descriptions; layout drawings; detail drawings; and electrical intercomections. Required submittals are noted in the Project Documents.

The shop drawing submittal and review process affords an opportunity to monitor and control the quality of construction before materials are delivered

to the site. AECI/AECOM will review and approve all shop drawings and maintain the shop drawing submittals on file. In the event a shop drawing submittal is not approved, the Contractor will be responsible for making corrections to each submittal, as required by AECI/AECOM. Approved copies of shop drawings will be made available to the EPA field representatives upon request.

### 5.7.2 Record Drawings

During construction, each Contractor is required to keep one set of Project Drawings at the site. The Contractor will show all project modification changes (regardless of how minor) to the work associated with this project on these drawings. The drawings will be kept current on a day-to-day basis in concert with the progress of the work. Where applicable, any changes marked on the drawings will include the notation "per Change Order No. ____" or similar reference that cites the reason for the change. These drawings will be made available to the EPA for review upon request. Upon substantial completion of the project, the Contractors will provide the Record Drawings to AECI for inclusion in the Certification of Construction Completion Report. AECI will distribute to AR project team members. The Construction Manager will maintain the Record Drawings.

### 5.7.3 Equipment Manuals

The Contractors will submit to AECI, instruction, bulletins, diagrams, and other data and information required for the proper operation and maintenance (O&M) of any installed mechanical or electrical equipment (e.g., pumps, valves), including spare parts lists and information on ordering of spare parts. The Contractors will submit to AECI, a minimum of two sets of each document unless otherwise specified in the Project Documents.

### 5.7.4 Photographic Records

Photographs may be used as tools to document the progress and acceptability of the work and may be incorporated into the daily site logbook reporting, the inspection logbook reporting, and the acceptance report. Each photo shall be identified with the following information:

- The date, time and location of photograph
- The name of photographer
- The signature of photographer

## 5.8 Completion of Construction

Completion of construction will include, at a minimum, the following:

### 5.8.1 Pre-Final Completion of Construction Inspection

AR will notify EPA upon substantial completion of project construction for the purpose of conducting a Pre-final Completion of Construction Inspection. The inspection will consist of a walk-through inspection of the entire project site by AR accompanied by EPA. The inspection is to determine whether the project is complete and consistent with the design documents and EPA approved plans regarding the site. Any outstanding construction work discovered by AR or EPA during the inspection will be identified and noted. Additionally, all mechanical equipment will be operationally tested by AR. Re-testing will be completed where deficiencies are revealed.

### 5.8.2 Pre-Final Completion of Construction Inspection Report

The Pre-final Completion of Construction Inspection Report, prepared by AR will outline any outstanding construction work, actions required to resolve outstanding construction work, tentative completion dates for outstanding construction, and a proposed date for Final Completion of Construction Inspection. The Pre-final Completion of Construction Inspection Report will be submitted to EPA for approval.

### 5.8.3 Final Completion of Construction Inspection

AR will notify EPA upon completion of any outstanding construction work for the purpose of conducting a Final Completion of Construction Inspection. The Final Completion of Construction Inspection will consist of a walk through inspection of the project site conducted by AR and accompanied by EPA. The Pre-final Completion of Construction Inspection Report will be used as a checklist for the Final Completion of Construction Inspection focusing on the outstanding construction work previously identified.

### 5.8.4 Final Completion of Construction Report

After completion of a successful Final Completion of Construction Inspection and upon receipt of all necessary documentation from the Contractors, AR will prepare and submit for approval by EPA, a Completion of Construction Report. In the report, a registered professional engineer and BP's Project Manager will certify that the projecf is consistent with the Project Documents.

The report will include, but not be limited to the following elements:

- Introduction
- Chronology of events
- Performance Standards and Construction Quality Control

- Summary of construction activities
- Summary of final inspection
- Certification by the CQA officer that the construction has been prepared and constructed in accordance with engineering design
- Record drawings (as-builts) signed and stamped by a professional engineer
- All daily summary reports
- Explanation of any modifications to the plans and why these were necessary for the project
- Certification that the system is operational and functional
- Results of site monitoring, indicating that the work will meet or exceed the performance standards, and
- Explanation of the O&M (including monitoring) to be undertaken at the site and any changes required based on modification of site plans during construction.

A Professional Engineer (PE) licensed in the State of Colorado will certify the final completion of Construction Report. The certifying engineer will have been on site during inspection and testing of critical aspects of construction. The PE will provide certification that the Completion of Construction Report and record drawings were completed in accordance with the final design documents.

### 5.8.5 Acceptance of Completed Construction

EPA will notify AR that the construction has been fully performed following receipt of the Final Construction Completion Report.

## 5.9 Storage of Records

During construction, the CQA Officer will maintain a copy of the Construction Drawings and the Construction Specifications, CQAPP and Problem/Corrective Action reports in the site office. Once the construction is complete, all CQA documents (originals) will be retained by AR, AECOM and AECI.

# 6 Surveying and Site Layout

Surveying and Site layout will be the responsibility of the Contractor(s). The Contractor will furnish all labor materials, surveying instruments, and tools to perform surveying and Site layout and maintain all lines, grades, and elevations in accordance with the requirements of the project Construction Plans and Specifications. AECI can verify contractor survey and lay out at its discretion.

# 7 Site Security

Pond Site security will be the responsibility of the Supervising Contractor. The level of Site security will be dependent on the activities being performed; however, security measures will consist of, at a minimum, items such as temporary fencing or barriers, warning tape, signs, and daily sign-in/sign-out sheets. In addition, all Contractors will comply with any owner-specified Site security measures.

# Figure 1

# Organization Chart